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Applicants: Cyprian Uzoh et al.

Serial No.: Not Yet Assigned (Divisional of 09/544,558) — Prior Group Art Unit: 3723

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Title: MODIFIED PLATING SOLUTION FOR PLATING AND PLANARIZATION AND PROCESS UTILIZING SAME

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Please cancel claims 1-11 and add the following new claims prior to examination.

--21. (New) A plating solution for plating a conductive layer on a surface of a substrate, comprising:

a solvent;

an ionic species of a conductive material; and

an oxidizer.

22. (New) A plating solution according to Claim 21, wherein said oxidizer is selected from the group consisting of an inorganic oxidizer, an organic oxidizer, and mixtures thereof.

23. (New) A plating solution according to Claim 21, wherein said oxidizer is an organic nitrite selected from the group consisting of alkyl nitrites, aromatic nitrites, and polyaromatic nitrites.

24. (New) A plating solution according to Claim 21, wherein said solution has a pH value of less than 4.

25. (New) A plating solution according to Claim 21, wherein said oxidizer is present in an amount of 0.01 to 10 wt.% of said solution.

26. (New) A plating solution according to Claim 21, wherein said conductive metal is Cu.

27. (New) A solution according to claim 23, wherein the oxidizer is butyl nitrite.

28. (New) A solution according to claim 21, wherein the oxidizer is an organic nitrate selected from the group consisting of alkyl nitrates, aromatic nitrates, and polyaromatic nitrates.

29. (New) A solution according to claim 28, wherein the oxidizer is butyl nitrate.

30. (New) A solution according to claim 21, wherein the solution is acidic.

31. (New) A solution according to claim 30, wherein the solution has a pH value less than or equal to 0.5.

32. (New) A solution according to claim 21, wherein the solution is used for depositing and planarizing the conductive material on the surface of the substrate.

33. (New) A solution according to claim 32, wherein the solution is used for sequentially depositing and planarizing the conductive material on the surface of the substrate.

34. (New) A solution according to claim 32, wherein the solution is used for simultaneously depositing and planarizing the conductive material on the surface of the substrate.

35. (New) A solution according to claim 21, wherein the solution is recyclable for repeated use.

36. (New) A method of modifying a plating solution into an enhanced solution for both plating and planarizing a conductive material on a surface of a substrate, the method comprising:

adding an effective amount of an oxidizer to the plating solution, wherein the addition of the effective amount of the oxidizer modifies the plating solution into the enhanced solution.

37. (New) A method according to claim 36, wherein the enhanced solution can be used for plating and planarizing the conductive material on the surface of the substrate in a single process.

38. (New) A method according to claim 37, wherein the enhanced solution can be used for sequentially plating and planarizing the conductive material on the surface of the substrate.

39. (New) A method according to claim 37, wherein the enhanced solution can be used for simultaneously plating and planarizing the conductive material on the surface of the substrate.

40. (New) A method according to claim 36, wherein the pH of the enhanced solution is not appreciably different than the pH of the plating solution.

41. (New) A method according to claim 36, wherein the oxidizer is selected from the group consisting of an organic oxidizer, an inorganic oxidizer, and mixtures thereof.

42. (New) A method according to claim 36, wherein the oxidizer is an organic nitrite selected from the group consisting of alkyl nitrites, aromatic nitrites, and polyaromatic nitrites.

43. (New) A method according to claim 42, wherein the oxidizer is butyl nitrite.

44. (New) A method according to claim 36, wherein the oxidizer is an organic nitrate selected from the group consisting of alkyl nitrates, aromatic nitrates, and polyaromatic nitrates.

45. (New) A method according to claim 44, wherein the oxidizer is butyl nitrate.

46. (New) A method according to claim 36, wherein the oxidizer has a concentration range of less than 500 ppm.

47. (New) A method according to claim 36, wherein the oxidizer has a concentration of 0.01 to 10 weight percent of the enhanced solution.

REMARKS

Upon entry of this Preliminary Amendment, claims 12-47 will be presented for examination. These claims correspond to the non-elected claims canceled by the Reply filed on November 9, 2001 in parent application serial no. 09/544,558.

Respectfully submitted,

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